

## APPENDIX A—BIBLIOGRAPHY

(A1) EIA Standard RS-464, Private Branch Exchange (PBX) Switching Equipment for Voiceband Applications.

(A2) EIA Standard RS-478, Multi-Line Key Telephone Systems (KTS) for Voiceband Applications.

(A3) EIA Standard RS-470, Telephone Instruments with Loop Signaling for Voiceband Applications.

(A4) EIA Project Number PN-1361, Environmental and Safety Considerations for Voice Telephone Terminals.

(A5) Federal Communications Commission Rules and Regulations, part 68, Connection of Terminal Equipment to the Telephone Network.

(A6) IEEE Standard, Method for Measuring the Magnetic Field around a Telephone Receiver. (to be published)

[49 FR 1363, Jan. 11, 1984, as amended at 61 FR 42187, Aug. 14, 1996]

**§ 68.317 Hearing aid compatibility volume control: technical standards.**

(a) An analog telephone complies with the Commission's volume control requirements if the telephone is equipped with a receive volume control that provides, through the receiver in the handset or headset of the telephone, 12 dB of gain minimum and up to 18 dB of gain maximum, when measured in terms of Receive Objective Loudness Rating (ROLR), as defined in paragraph 4.1.2 of ANSI/EIA-470-A-1987 (Telephone Instruments With Loop Signaling). The 12 dB of gain minimum must be achieved without significant clipping of the test signal. The telephone also shall comply with the upper and lower limits for ROLR given in table 4.4 of ANSI/EIA-470-A-1987 when the receive volume control is set to its normal unamplified level.

NOTE TO PARAGRAPH (a): Paragraph 4.1.2 of ANSI/EIA-470-A-1987 identifies several characteristics related to the receive response of a telephone. It is only the normal unamplified ROLR level and the change in ROLR as a function of the volume control setting that are relevant to the specification of volume control as required by this section.

(b) The ROLR of an analog telephone shall be determined over the frequency range from 300 to 3300 HZ for short, average, and long loop conditions represented by 0, 2.7, and 4.6 km of 26 AWG nonloaded cable, respectively. The specified length of cable will be simu-

lated by a complex impedance. (See Figure A.) The input level to the cable simulator shall be -10 dB with respect to 1 V open circuit from a 900 ohm source.

(c) A digital telephone complies with the Commission's volume control requirements if the telephone is equipped with a receive volume control that provides, through the receiver of the handset or headset of the telephone, 12 dB of gain minimum and up to 18 dB of gain maximum, when measured in terms of Receive Objective Loudness Rating (ROLR), as defined in paragraph 4.3.2 of ANSI/EIA/TIA-579-1991 (Acoustic-To-Digital and Digital-To-Acoustic Transmission Requirements for ISDN Terminals). The 12 dB of gain minimum must be achieved without significant clipping of the test signal. The telephone also shall comply with the limits on the range for ROLR given in paragraph 4.3.2.2 of ANSI/EIA/TIA-579-1991 when the receive volume control is set to its normal unamplified level.

(d) The ROLR of a digital telephone shall be determined over the frequency range from 300 to 3300 Hz using the method described in paragraph 4.3.2.1 of ANSI/EIA/TIA-579-1991. No variation in loop conditions is required for this measurement since the receive level of a digital telephone is independent of loop length.

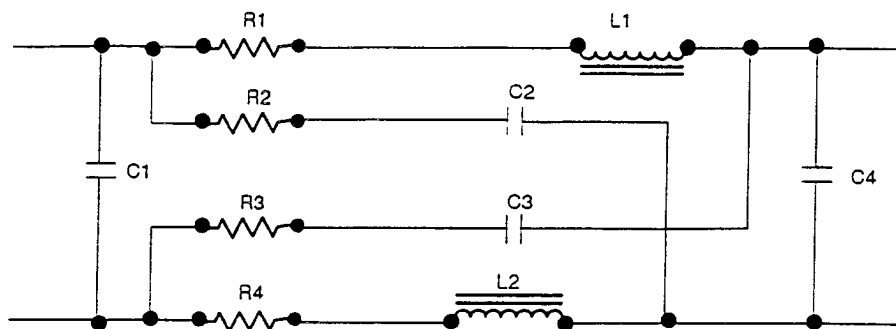
(e) The ROLR for either an analog or digital telephone shall first be determined with the receive volume control at its normal unamplified level. The minimum volume control setting shall be used for this measurement unless the manufacturer identifies a different setting for the nominal volume level. The ROLR shall then be determined with the receive volume control at its maximum volume setting. Since ROLR is a loudness rating value expressed in dB of loss, more positive values of ROLR represent lower receive levels. Therefore, the ROLR value determined for the maximum volume control setting should be subtracted from that determined for the nominal volume control setting to determine compliance with the gain requirement.

(f) The 18 dB of receive gain may be exceeded provided that the amplified receive capability automatically resets to nominal gain when the telephone is

caused to pass through a proper on-hook transition in order to minimize the likelihood of damage to individuals with normal hearing.

(g) These incorporations by reference of paragraph 4.1.2 (including table 4.4) of American National Standards Institute (ANSI) Standard ANSI/EIA-470-A-1987 and paragraph 4.3.2 of ANSI/EIA/TIA-579-1991 were approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies of these publications

may be purchased from the American National Standards Institute (ANSI), Sales Department, 11 West 42nd Street, 13th Floor, New York, NY 10036, (212) 642-4900. Copies also may be inspected during normal business hours at the following locations: Federal Communications Commission, 2000 M Street, NW., Public Reference Room, Room 220, Washington, DC 20554; and Office of the Federal Register, 800 N. Capitol Street, NW., suite 700, Washington, DC.



| Component                       | 0.914 km (3 kft) | 1.83 km (6 kft) |
|---------------------------------|------------------|-----------------|
| R <sub>1</sub> , R <sub>4</sub> | 124 Ω            | 249 Ω           |
| R <sub>2</sub> , R <sub>3</sub> | 174 Ω            | 312 Ω           |
| C <sub>1</sub> , C <sub>4</sub> | 0.0113 μF        | 0.0226 μF       |
| C <sub>2</sub> , C <sub>3</sub> | 0.0122 μF        | 0.0255 μF       |
| L <sub>1</sub> , L <sub>2</sub> | 0.336 mH         | 0.983 mH        |

**Notes:**

(1) All values are  $\pm 1\%$ .

(2) 2.7 km (9 kft) and 4.6 km (15 kft) can be made up of cascaded sections of the above.

### Loop Simulator for 26 AWG Cable

[61 FR 42187, Aug. 14, 1996]